A PSYCHOPHYSIOLOGICAL STUDY OF YOGA

by

HIROSHI MOTOYAMA, Ph. D.

B
132
Y6
M69
GTU

1976.6

Institute for Religious Psychology

4-11-1, Inokashira,
Mitaka-shi,
Tokyo, Japan 181

B
132
Y6
M69

Digitized by the Internet Archive
in 2025 with funding from
Graduate Theological Union

https://archive.org/details/psychophysiologi00unse

A Basic Outline of Yogic Discipline and Some of Its Psychophysiological Concomitants

This article will attempt to explore yoga through its physiological and parapsychological aspects, rather than by examining it's philosophical or ideological side. Firstly, we will briefly define yoga, including a description of the stages of yogic discipline and the different methods which have evolved through stressing different aspects of these stages. Throughout the text of the above explanation, some of the differences and similarities between these stages and methods and those intrinsic to other religions will be brought out, along with some of the apparent contrasts within the yogic methods themselves. References will also be made throughout the paper to the differences between true spiritual phenomena produced through religious discipline and those phenomena brought to manifestation by methods of modern psychotherapy such as hypnosis or Schultz's autogenic training.

The latter section of the paper will begin with a more detailed description of the kundalini/chakra mechanism and its physiological concomitants. This will serve as background for a discussion of the research carried out at our Institute, the Institute for Religious Psychology, Tokyo, over the last twenty years. We will concisely trace the development of this research, much of which revolves around physiological and parapsychological examinations given to an array of psychically developed and non-developed subjects. Particular attention will be given to the tests done on certain Indian yogis, those ascetics who actualize yogic discipline. The research results which will be stressed in the conclusion are those which indicate the psychophysiological characteristics of spiritually developed individuals who possess paranormal

abilities. The paper will then finish with a brief discussion of the purpose and goal of spiritual development.

A Definition of Yoga

The original concrete meaning of the word yoga is "yoke", such as that placed on a cow or horse, which has given it the abstract meaning "to control". This concept was gradually broadened to represent the idea of the self-control one places on the mind and the senses in order to unify with the True Self (purusha); that is, to become one with God. This is the same control referred to as "shi" (concentration) in Tendai Buddhism or which Zen Buddhism emphasizes so heavily in its method of meditation.

We can expand this definition to describe the process of yogic discipline. After placing a yoke of control on the ever restless mind, one draws the mind into one point. This leads one to concentration and eventually into deep meditation. Although this is the essential process, an overview of yoga shows various distinct types which differ as to concrete methodology. Patanjali culled the basic stages of the yogic process from the various dogmas prevalent in India from the second century B.C. to the fifth century A.D. and codified these into a work called "The Yoga Sutra." Although the many doctrines existing at that time could not be consolidated on the basis of the Sankya philosophy, the process of the actual discipline itself clearly was organized into eight stages by Patanjali. Previously there had been many conflicting ways of dividing and counting these steps. Here is a summary of the stages of Patanjali's systematization:

The Eight Stages

The first stage is called yama, and is the state where one disciplines, or abstains from evil actions and tendencies through obeying given commandments. The number of commandments differs according to the school.

Niyama is the second stage, where viture is consciously cultivated. In Taoism, for example, there exists an actual list of merits and demerits to which points are assigned in accordance with the strength of the virtue or sin. Each day the points for all virtuous actions and all negative deeds are tabulated, and this system is used to encourage the accumulation of merit. Buddhism, also, in the early stages of practice, attaches much importance to an ethical training where fixed precepts are followed and positive deeds such as the offering of charity are encouraged.

The avoidance of committing evil and the active attempt to create merit seems, psychologically speaking, very important for both religious practice and daily life; that is, when evil is committed, the act gives rise to various complexes in the subconscious which consequently pose a threat to the conscious level, thereby disturbing the balance of the mind. This in turn leads to a disturbance in the workings of the body/mind relationship which may manifest itself as disease or other related problems. One is likely to exert a negative influence on personal relationships and society in general. In contrast to this, if one commits only virtuous acts, the mind will be able to exist peacefully. A proper balance between the consciousness and unconsciousness will be maintained. This balance is particularly important if one is attempting to progress in a religious discipline.

The third stage is that of asana, i.e. posture, or way of sitting. Among the various meditation postures, there are two major ones: the full-lotus and the half-lotus, known in Zen as kekkafuza and hanza, and in yoga as padmasana and siddhasana. Since posture exerts a great influence on both the regulation of breath and the quality of meditation itself, sitting correctly is deemed to be of major importance. If

one finds it difficult to sit in either of these positions, a pillow should be placed under the buttocks so that the spinal column is straight (allowing for the natural curvature) and the position comfortable. The most important points to note regarding posture are that the spinal column is kept straight and that all unnecessary tension is released from the neck, shoulders, lower back, and arms, while the center of gravity is naturally held in the tanden, a spot about an inch below the navel. If one is sitting correctly, this position can be held easily for a very long time.

There are a number of people at the Lanawara Yoga Institute in India who are doing physiological research into areas such as the effects on respiration and heart of leaning to the left or right, front or back while sitting in a meditation posture, and the result of the effects on the meditation itself. They are also trying to determine physiologically what is the naturally best posture for spiritual development. Dr. Vijyendra Pratap, the acting president of the Institute, is a graduate of Bombay University where he did psychophysiological research into yoga. He himself is a meditator, and his research resembles that of the Komazawa University Zen Institute founded by Professor Akishige[1], which is examining, through electronics, the changes in the body's equilibrium during Zen meditation.

The fourth stage of yogic discipline is pranayama, regulation of breath. Prana has the same meaning as the Greek "Pneuma" and the Latin "Spiritus", i.e. the breath of God, or spirit. The Chinese term is "chi", the Japanese "ki". Pranayama is a crucial factor in yoga, whether it be

---

[1]This paper was originally delivered as a lecture to the Zen Institute on May 9, 1971 which accounts for the many references to Zen Buddhism throughout this article.

hatha yoga or the more Zen-like raja yoga.[2] As to method, there have been various ways to regulate the breath devised by both yoga and other religious traditions. For example, the Taoists teach a method they call temporin, the circulation of light. The disciple concentrates either on drawing the breath from the coccyx to the head and back to the coccyx (the shoshuten, lesser circle) or from the soles of the feet to the head and back down again (the daishuten, greater circle). This method is practically identical to yogic pranayama, and its purpose, as in all types of pranayama, is to inhale prana, the life force which pervades the entire universe. The inhaled prana is then mixed and unified with the inherent life force asleep at the base of the spine, the kundalini, in order to return to the original state of oneness which existed before these energies were divided.

The fifth stage is called pratyahara, withdrawal of the senses. To accomplish this, one enters a quiet place such as a meditation hall and with the eyes closed or half-open, practices holding the mind back from reacting to the stimuli of the outside, mundane world. And then one turns the senses and the mind inwards.

The sixth stage is dharana, in which the mind which has gained control over the senses turns inward and concentrates one-pointedly on a chosen object, such as a certain chakra or a mandala.

The seventh stage is dhyana, variously translated as meditation or contemplation, and differs from dharana in depth and duration.

A deep comparative study of the ascetic disciplines of

---

[2]However, while Zen does use the practice of counting the breath, regulation does not seem to be stressed.

various religions reveals something comparable to dharana and dhyana in all of them. In Christianity, there even exist practices called by the same terms, meditation and contemplation. In relation to this, upon examination, it appears that the experiential aspects of these practices are not significantly different, but as soon as the experience enters the cultural sphere of Christianity, or Islam, or Buddhism, the interpretation of the experience becomes radically changed. For this reason the contents of the experience seem to differ.

One characteristic of having reached the stages of dharana or dhyana is that it is now easy for certain troubling illusory phenomena to arise. These may manifest as problems in the conscious or unconscious mind, as the forceful activation of worldly desires and thoughts (klesa)or possibly as direct confrontation with the demon realms. Various methods have been discovered and taught to deal with and to overcome these difficulties effectively. For example, we have the Soto Zen method of allowing these phenomena to rise at will and run their course, while in Rinzai Zen the more active approach of attempting to stop the restless mind through one-pointed concentration and thus to subjugate the welling up of these phenomena is advocated. In yoga, stopping the breath or slowing it down to a barely perceptible rhythm is practiced as an aid to stopping the mind. Through this training, the appearance of klesa subsides, the mind grows lucid, and one attains unification with the object of concentration.

As one gradually becomes more proficient at dharana, one enters the deeper state of dhyana. This stage is characterized by a residual duality existing between the object of meditation and the mind which is concentrating upon it.

When one is finally able to break through this duality into the state of unification of subject and object, one has entered the last of the eight stages, that of samadhi. In the first stages of samadhi, inspectional samadhi (savitarka sampatti) and investigational samadhi (savicara sampatti), there is not yet absolute unification, because there still remains a subtle dualism between subject and object. In the next stages, non-inspectional samadhi (nirvitarka sampatti) and non-investigational samadhi (nirvicara sampatti), a complete subject and object unification is attained. Following this is the highest samadhi known as nirvicarpa samadhi.

There is an often quoted yoga teaching which says that if the mind is moving, so are the heart and the respiration. It therefore appears that one way to stop the mind and enter the state of unification is to quiet the mind through suspending the respiratory functions. Accordingly, one criterion which may be used for distinguishing between these last three stages, dharana, dhyana, and samadhi, is to look at the length of time the meditator's breath is stopped. It is possible, for example, that in dharana the breath may be stopped for 1-2 minutes, in dhyana for several minutes, and in samadhi for 12 minutes or more. As will be discussed later, whether or not a person has entered a deep state of unification can be determined more clearly through observing his respiration, and more so his heart beat, than through measuring his brain waves.

So these are the eight stages of yoga as systematized by Patanjali, within which framework we can see the main current of yogic discipline. However, various methods of yoga have developed which can be divided into three general groups, depending on which aspects of the eight stages they emphasize. The first division is comprised of the methods

which place all their emphasis on Enlightenment and attaining the absolute oneness of True Self. The second contains those which concentrate solely on physical health. And the third division includes all the methods which emphasize the awakening of paranormal abilities, the same type of abilities now being taken as the object of parapsychological and psychotronic research. Let's now look at these divisions in more detail.

The Various Kinds of Yoga

Yogas in which the primary object is spiritual:

Raja yoga, raja meaning king, is considered to be first in this group. The stages of the eight which are emphasized in this discipline are dharana, dhyana, and samadhi. The object of the practice is to directly realize Absolute Self, and in this way raja yoga is quite similar to Zen Buddhism.

Next in this division we have bhakti yoga, of which much is written in the Bhagavad Gita. Bhakti means love, and through the medium of the last three stages--dharana, dhyana, and samadhi, one concentrates on loving God to realize unification with the Supreme Being.

Karma yoga, which utilizes "non-action within action" in the situations of everyday life, is included within this group. "Non-action within action" may be explained in the following way: When a human being performs an ordinary act, this act may be said to be performed by an individual with a personality. "Non-action within action", however, is the mode of behavior in which there is just the act in and of itself. Through progress in this yoga, one is gradually able to perform acts which are not created by the individual consciousness existing within a narrowly limiting shell. Since acting while desiring a certain result from the action necessarily creates results, or karma, in karma yoga

one attempts to act without desiring any results from the action in order to refrain from creating more karma. This process gradually enables one to break through the shell of the individual consciousness into the unrestricted state of the non-self.

Next is jnana yoga, the object of which is to attain prajna, transcendental wisdom, through the medium of thought and meditation. In bhakti yoga one offers his complete self to God, entrusting himself to God, melting into God. In contrast, jnana yoga states that anything which will cease to exist, such as the flesh, is not eternal and therefore not God. In consequence, they attempt to attain absolute wisdom and eternal truth, through the mind; that is, through thought and meditation alone. This seems to be a very difficult method, because to succeed one must ultimately throw away the thought process itself to which the practitioner has necessarily become very attached.

Yogas in which the primary object is physiological:

The first of these is hatha yoga. HA means inhalation, THA means exhalation, and this yoga sets a great value on the practice of pranayama, the regulation of breath. Through this it directly aims at establishing and maintaining a healthy body. However, hatha yoga is also considered to be an important preparatory stage for raja yoga. Data obtained from the examination of a hatha yoga guru in India will be later presented to illustrate some of the physiological effects of pranayama.

There is one other type of physiologically centered yoga known as viayama whose sole purpose is good health. This method focuses on physically training the body, and may be likened to gymnastics. We can see similar training in the Zen-related shorinji kempo or the uho exercises of Taoism.

Yogas which emphasize the paranormal:

The term for paranormal ability or divine power in yoga is "siddhi". This originally had the meaning of "to reach" and has come to be used in reference to the powers or abilities which awaken as one reaches nearer to unification with God. There seems to be some confusion in the various interpretations of these powers. Raja yoga strongly cautions against setting up the attainment of siddhi as one's main objective, which we agree with, but in raja as in hatha and all other yogas, we find that paranormal abilities develop spontaneously as one progresses in the discipline. As for Zen, the hallucinations which occur before true psychic abilities appear are not distinguished from the mysterious things one sees and hears after they are awakened. All are lumped together under the term makkyo (manifestations of the demon realms), which Zen clearly ignores or avoids. It may be that Zen is over-emphasizing non-attachment to the mysteriousness of psychic power or that it is afraid of the demon realms, but it would seem that one must overcome, rather than avoid, these phenomena.

In the chapter entitled "Kakuchimaji" of the Shoshikan, meditation manual of the Tendai sect of Buddhism, there is much written about makkyo. Some of the phenomena discussed actually do exist, but others are mistaken to be true psychic phenomena while they are simply parts of a one-man play put on in the mind by the extremely strong unconscious. We can see the same thing in hypnosis, where at a certain perceptual stage of the hypnotic state, a subject who is made to hold onto a pencil and given the suggestion that it is a pair of red hot tongs will actually receive a burn. This type of phenomena is not what is meant by the term siddhi.

The attainment of true siddhi, as described in detail in the Yoga Sutra, is the aim of laya yoga and kundalini yoga. Both of these attempt to awaken the kundalini, the primal force of the universe and of life itself, which sleeps latent in all human beings. Its awakening produces evolutionary changes in the body and mind while at the same time bringing about the realization of psychic powers. The practice of kundalini yoga is at the present time the prevalent approach among those studying yoga.

In this group is mantra yoga, as it, too, sets paranormal or spiritual phenomena as its primary object. A mantra is an incantation which manifests psychic power when chanted. There are many newly arisen religions which promote the avid chanting of various mantras, for example the Heart Sutra, in order to heal disease or satisfy personal wishes. It may be said that these religions are based on mantra yoga practice.

These, then, are the three groups of yogas, classified according to method and objective. As one progresses through the eight stages described by Patanjali, however, discriminations among goals are necessarily dissolved, and one spontaneously achieves all three objectives: the physical, the paranormal, and the spiritual. It must also be noted that although all true yogic development includes the above goals, before the oneness (kaivalya) of True-Self is reached, there does exist an apparent difference between hatha and raja yoga. What follows is an exploration of this difference through the examination of the physiological changes which are produced by the respective disciplines.

Method Differentiated Concomitants

In this section, we'd like to compare the polygraphs of two advanced Indian ascetics, one of whose practice combines hatha and kundalini yoga and the other of whom is a devotee of raja yoga.

First we shall examine the polygraph of the former, known as the Kakinada guru, (Figure 1).

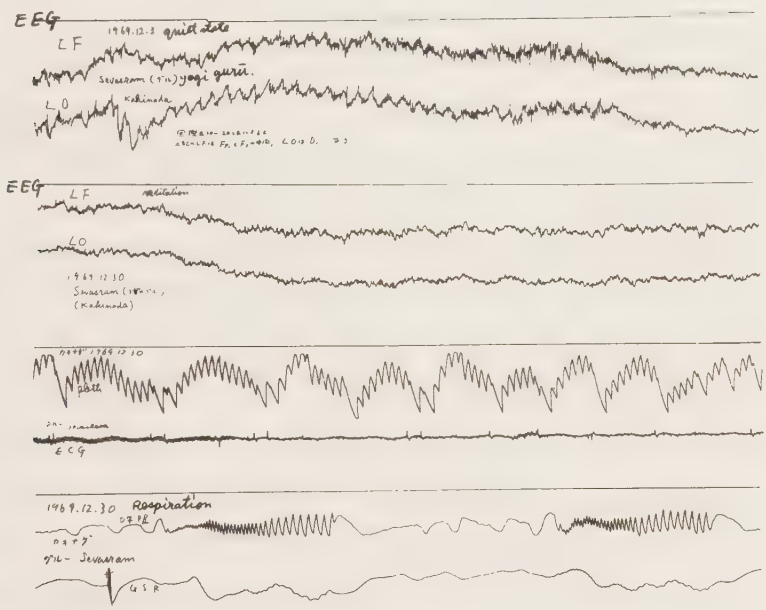

Fig. 1 Data of Kakinada guru, EEG, Plethysmogram, ECG, Respiration, GSR

The top two lines represent the EEG of the left frontalis and and the left occipital regions. This data was taken while the guru was executing bastrica, rapid breathing, and due to this influence, both baselines show fluctuation. Analyzing the components, we see a predominance of Beta waves. The bottom two lines of the EEG were taken after the guru had entered a trace-like samadhi, and are of the same regions

as the top. Here we can again see many Beta waves, but the potential is lower than when performing bastrica and the baselines do not fluctuate to the same extent, though we do see fluctuation in both cases. It therefore appears that Beta waves and baseline fluctuation are two things these measurements have in common.

One generalization which might be drawn from this evidence is that those who practice a hatha yoga which centers on pranayama or those who are trying to awaken their kundalini show a relatively high number of Beta waves (from 1 to 3) and that they produce baseline fluctuation. The latter is a common characteristic of the EEG's of yogis and spiritually developed persons who have so far been taken in India, America, the Phillipines, and Japan. This fluctuation indicates that the fundamental potential of each part of the brain tissue is characterized by a wider degree of activity than that of a normal person whose baseline is constant.

We can see another characteristic of yogis and psychic persons by looking at the plethysmograph (top line of third sheet), whose baseline fluctuates with a fixed rhythm, showing a constant and regular change in the function of the heart and circulatory system. This indicates that the nerves which control circulation exhibit a rhythmical variation; that there is rythmical fluctuation in the basic level of the amount of blood contained in the arteries, veins, and their places of conjunction, the capillaries. In the above plethysmograph, we cannot see the rhythmical change caused by breathing in the amount of venal blood flowing back towards the heart (refer to the respiration line second from bottom). That is to say, there is no correspondence between the rhythm of the pulse and that of the respiration, as in the case of a person whose skeletal muscles are weak.

The cause of the phenomena exhibited in the plethysmograph is a functional change within the nerves controlling the arteries, particularly the sympathetic nerves. Another cause for the fluctuation in the baseline of the plethysmograph is a functional change in the heart. Looking at the GSR (bottom line), we see another characteristic which always seems to be exhibited by this type of person; that is, remarkable excitement of the sympathetic nerves. In the ECG (third line from the bottom) we see large R spikes appearing at almost the same places as the low points in the baseline fluctuation of the plethysmograph. This indicates that there exists a relationship between the fluctuation of the baseline and the excitement/contraction of the heart ventricle.

Looking again at the respiration, note the extremely fast rhythm caused by the performance of bastrica. This method of rapid breathing is dangerous for a normal person, and would cause such abnormal conditions as extreme headache, nausea, and fainting if attempted without sufficient training. This guru can breathe about forty times in twelve seconds, whereas a normal person breathes about sixteen times in one minute. On the graph, the guru stops bastrica and breathes just slightly faster than normal for eighteen seconds, then begins bastrica again. We see the rythmical fluctuation in both the normal and bastrica states. The guru explained that this method of respiration is exceedingly beneficial for awakening the kundalini because, through it, one inhales much more of the universal prana than in other breathing methods. This prana awakens the kundalini resting at the base of the spine, which in turn rises to the parietal (top of the head) through the central canal of the spine. When kundalini is awakened pronounced changes, or developments, are produced in mind and body, and the workings of the autonomic nervous

system become greatly different from the norm. We can see proof of these developments in the guru's polygraph as given above.

One of this guru's disciples, an assistant professor of electronics at the Institute of Technology in Kakinada, was also tested while he performed bastrica. (Fig. 2) But, as he had been practicing for less than a year, there is no rhythmical fluctuation in the baseline of the plethysmograph. His GSR shows no excitement of the sympathetic nervous system. This is valuable data as it unmistakeably indicates differences between the mature guru and the not yet developed disciple.

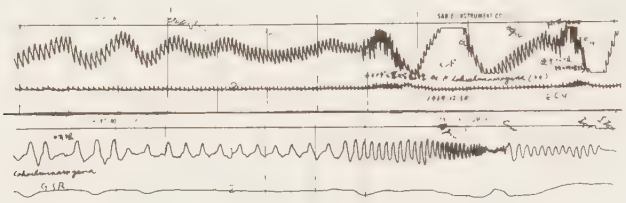

Fig. 2 Polygraph of Kakinada Guru's Disciple

Another interesting point is that the guru takes one very large breath just before entering samadhi. He then evidences loss of ordinary consciousness as he makes the transition to super-consciousness. From time to time spasms occur in his arms and legs. There are other individuals, however, who do not lose their ordinary consciousness while making this transition because they are able to manifest super-consciousness more easily.

In contrast to the above, here is a polygraph taken at the Shanti Ashram in India of a devotee of raja yoga, a school similar to the Soto sect of Zen Buddhism. (Fig. 3) Looking at the EEG, we see a predominance of Alpha waves in both LF

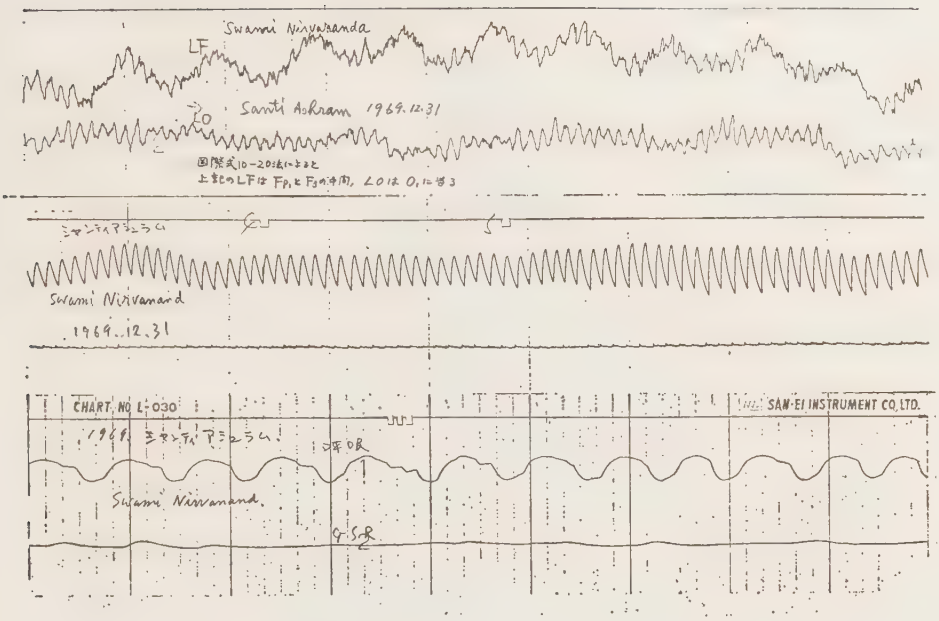

Fig. 3 Polygraph of Shanti Ashram Yogi

and LO, and the potential is rather high. As this guru happened to be about seventy, the plethysmograph displays a pattern which indicates hardening of the arteries. When the aortic valve of an elastic heart shuts after the ventricle has finished its contraction, the blood in the aorta rushes back towards the valve where it hits and changes course again towards the periphery. This phenomena causes incision in the plethysmograph which are not seen in this particular one, a sign of age. Comparing this plethysmograph to the Kakinada guru's, we see that both the baseline and the potential are very stable. Since the gain of the ECG apparatus was insufficient, each individual wave is not clear. However, we can still see that the baseline is stable, showing no abnormality of occasional high R spikes as in the case of the Kakinada guru. Checking the respiration, we see

that the raja yogi's breathing is slower than a normal person's at fourteen times a minute, despite the fact that at the time this was taken he had a cold. The GSR shows no change, meaning that the sympathetic nerves are stable. In contrast to the Kakinada guru, we see here parasympathetic predominance. We believe that this is because the type of discipline practiced by the Kakinada guru tends to excite the sympathetic nervous system and to cause its predominance, whereas a contemplative practice such as the meditation done at the raja yoga oriented Shanti Ashram produces parasympathetic predominance.

As far as we can see from the physiological standpoint, definite differences are produced depending on whether one practices a contemplative or a hatha/kundalini yoga. Yet, despite these differences and the fact that the stress is different, we must reiterate that to reach true Enlightenment the three goals as defined previously must all be attained. This means that the chakras and kundalini must necessarily be awakened, even if this is not a conscious objective next section of this article, therefore, we'd like to define and discuss the chakras and kundalini in more detail.

The Chakras and The Kundalini

According to yoga theory and practice, a human being has besides the body and mind usually known by us, a kind of subtle body (actually several higher bodies) which can not be perceived by the senses. The centers of this subtle body or system are termed chakra. These chakra accept prana, higher dimensional non-physical energy, from the universe and convert it into a kind of physical energy, which is in turn supplied to the internal organs and peripheral tissues through the spinal cord, nervous system, and blood system.

The chakra also supply the prana in its higher dimensional form to the subtle system through passageways called nadi.

Fig. 4 Chakras

Figure 4 is the representation of the chakras which appears in Avalon's Serpent Power, a respected work on yoga. The lowest of the seven chakras is the muladhara, wherein lies the kundalini. Second is the swadhisthana, third the manipura, fourth, the anahata, fifth, the visshuda, sixth, the ajna, and seventh, the sahasrara (top of the head). It is interesting to note that in Taoism there are also seven centers which are thought to correspond exactly to the chakras.[4] It is not known whether Taoism adopted these directly from yoga or not.

According to the teachings of yoga, kundalini is the a priori life force which in its original state is one with the universal energy. It is that which molds the so-called human being into one individual, after which it dwells asleep

[4]These are the shunkyu, genkyu, tankyu, shinkyu, ekikyu, meikyu, okyu, respectively.

on the spiritual plane in the muladhara chakra at the base of that individual's spine, while continuing to work to a limited extent in the physical dimension according to a fixed mechanism. However, the kundalini may be awakened by the individual through ascetic discipline. If such discipline continues, the activated kundalini will eventually pierce through the normally closed brahman gate which is located on the upper edge of the muladhara chakra[5], passing through each individual chakra, and gradually rise to the sahasrara chakra.

Yoga teaching states that if the kundalini doesn't rise through the central sushumna channel (which corresponds in the subtle body to the central canal of the spinal column in the physical) and if it doesn't pass through each chakra or rise all the way to the sahasrara chakra, one cannot attain the liberated state, the oneness of True Self. However, a lone chakra may be awakened and one may in consequence obtain the paranormal abilities associated with that chakra without having awakened all the chakras or the kundalini.

Gopi Krishna, an Indian guru, who is now establishing meditation centers throughout the world, describes his experience of unexpectedly awakening kundalini in his book Kundalini--The Evolutionary Energy in Man. Gopi Krishna began to meditate as a young man because of the dejection he felt upon failing an examination for a university scholarship. One morning, after 17 years of practice, he was concentrating his mind in the middle of his forehead as usual when he suddenly felt something move in his coccyx. This produced an extremely uncomfortable feeling which grew to be an intense burning throughout his entire body, an exhausting condition

---

[5]There are two brahman gates, the other of which is located at the top of the head.

which lasted for three months. The Kakinada guru also said he experienced similar sensations when his kundalini arose. This experience is described in the Yoga Sutra as being like thousands of suns shining at once, so brilliant that they blind the eye. This drawing was included in Gopi Krishna's book to depict the brilliance emanating from the chakras and the body when kundalini rises to the sahasrara chakra.(See Fig. 5) This phenomena cannot be seen by the ordinary senses; it is only perceived through non-physical means.

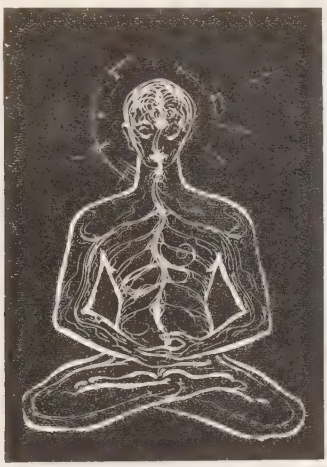

Fig. 5 Kundalini Rising

In the Treasure House of Mt. Koyasan there is a Nepali object which Kobo Daishi, founder of the esoteric Shingon sect of Buddhism in Japan, brought back with him from China. It is composed of a circle of decorated cloth surrounded by petals. Two opposite triangles are inscribed within the circle, in the middle of which is written the Sanskrit syllable (YA). This, unrealized by most of those at the museum, is the yogic symbol of the anahata (heart) chakra. (See Fig. 6) According to yogic teaching, each chakra has a symbol and a characteristic color which appears as a surrounding ring of light when seen extrasensorily. A guru is there-

fore able to judge immediately which of his disciples' chakras have awakened by using his own power to view the colors emanating from his disciple. A leader of the Ramakrishna sect has said that this is the method still used to determine the extent of a disciple's development and through which the disciple's position in the sect is assigned.

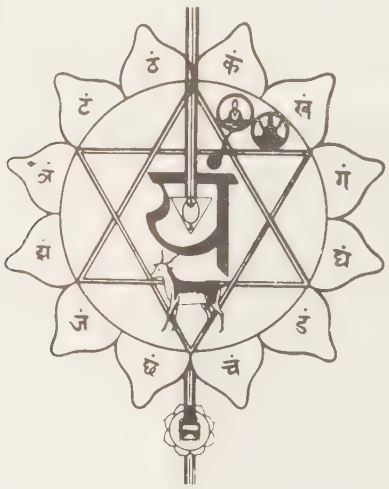

Fig. 6 Anahata Chakra

Research Into Chakras and Meridians

The kundalini/chakra system may be thought of as the mediator between the spirit and the flesh, corresponding to the bissaishin of Buddhism (subtle body, lingasharila in Sanskrit.) Accordingly, each chakra is closely related to a certain nervous plexus and the internal organ controlled by that plexus in the physical body. This knowledge has been known and passed down in certain cultures through the ages, and in India this ancient knowledge is now being confirmed from the standpoint of modern medicine. Related research reports have recently begun to be published. Fascinated by this work, I too began physiological experiments about

fifteen years ago to try to determine if chakras actually exist, and, if so, what, if any, is their relationship to the autonomic nervous system and internal organs.

For example, it is said that the manipura chakra has a close relationship to the solar plexus and the digestive system. If this is so, it seemed that those who claimed to have awakened their manipura chakra would display some abnormality of the stomach function--that its working would be somehow different from that of an ordinary person. In the same way, we would expect an awakened anahata chakra to produce changes in the workings of the heart. Through various examinations we have been able to determine that there are significant differences in the physiological function of the organ associated with the chakra that the individual subjects claimed to have awakened. Therefore, this research has led to the conclusion that chakras do, in fact, exist.

One of the men who has been doing research in the field of chakra/plexus relationship for many years is Dr. Ananda, head of Physiological Studies for the National Institute of Health in New Delhi. He ascribes the following correspondence:

1.	muladhara chakra	sacral and coccygeal plexus
2.	swadhisthana chakra	sacral plexus, genito-urinary system
3.	manipura chakra	solar plexus, digestive system
4.	anahata chakra	heart plexus in sympathetic trunk, circulatory system
5.	vishudda chakra	superior, middle, inferior cervical ganglions, respiratory system
6.	ajna chakra	hypophysis diencephalon, pituital gland
7.	sahasrara chakra	cerebral cortex

Finding the best method to determine more specific details about the chakra/physiology relationship has been very challenging. Modern biochemistry has devised various ways of examining the autonomic nervous system, but the findings seem rather too general. Wengel's method for investigating the excitement of the autonomic nervous system is original and interesting, but requires such complex statistical analysis that it does not seem to be very efficient or effective. So we began to search for an original method.

About ten years ago it had already been discovered that the condition of the internal organs is projected through respective spinal segments to certain fixed points on the skin and that this phenomenon changes the skin temperature and resistance at these points in accordance with the state of the organ. (Head, Sasagawa, Ishikawa, et al) Relying on this theory we chose the points on the trunk which were said to most clearly receive the projection of the functional states of the lungs, heart, stomach, kidneys, reproductive organs, and urinary system. (These, incidentally, are practically identical to certain acupuncture points which have been known for thousands of years in China.) The chosen points were then charged with 3-5V of direct current. By measuring the resultant resistance at these points we were able to check the state of the autonomic nerves controlling each internal organ. We then did a comparative study using this method among psychic, normal, and mentally unbalanced subjects.

This method of investigation is very similar to that begun by Dr. Ishikawa Hidetsurumaru, Professor of Physiology at Kyoto University, and further developed by his son, Dr. Ishikawa Tachio of Kanazawa Medical School. They explain the

viscero-cutaneous reflex system, the basis of the above type of investigation, as follows: The centripetal impulse from an abnormal function in, for example, the respiratory system, is sent through the sympathetic nerves to a fixed spinal segment, where it is transmitted to spinal and autonomic nerves which then project it centrifugally to a fixed cutaneous point. This will produce changes in the skin, muscle, minor arteries, and sweat glands surrounding that point, which may appear as sensitivity in the Head zone, stiffness in the MacKenzie zone, increase in the production of sweat, and insufficiency in the blood circulation. It follows that skin resistance and temperature will also change.

As each organ has a number of anterior and posterior reflex points, we chose those which had the highest probability of clearly indicating the functional state of each internal organ and charged them with direct current. DC was chosen over AC, because an exact measurement of the polarization of the interior and exterior of cutaneous cell walls cannot be taken with AC. Polarization is directly influenced by the state of the autonomic nerves which branch out from the spinal segments to the skin. Therefore, by measuring the polarization through DC we are able to determine the functional state of the autonomic nerves and the organs they are connected to.

The designated organs were chosen as objects of measurement because they are those said to have a corresponding relationship with a certain chakra; namely, correspondence is supposed between the lungs - vishudda chakra, heart - anahata chakra, stomach - manipura chakra, kidneys, urinary

bladder, and prostate gland(ovaries) - swadhisthana chakra. In subjects claiming to have awakened a certain chakra, we found a clear difference in the workings of the autonomic nerves controlling the organ connected to that chakra. This was also seen in the case of persons who possess inborn paranormal ability, i.e., in those who inherently possess some degree of ability without having undertaken ascetic discipline.

Although the above method of examination was able to produce valuable findings, it also presented several problems. Viscero-cutaneous reflex points have a diameter of about three centimeters, whereas the area which actually manifests the changes caused by the projected impulse may be anywhere from only 1 mm to 1 cm in diameter. To insure detection of the impulse, therefore, a negative electrode of at least 3 cm must be used. It is difficult to distribute such large electrodes evenly over the skin surface due to the curvature of the body, so we were inexpediently limited to the use of 2.5 cm diameter electrodes which could result in deviations from the proper reading of the impulse. We were further inconvenienced by the high degree of dexterity required to correctly place the electrodes. Another disadvantage was that the subject had to bare the top half of his body to reveal the reflex points, and would react to changes in temperature even if the room were warm which altered the value of the DC resistance. For these reasons, we began searching for a better method, hopefully one which could measure the autonomic nervous function of a wider variety of organs and tissues, and one which could also examine the movement of prana (vital energy) throughout the

body.

Around this time I developed an ailment which helped to turn me in the right direction. Probably due to the beneficial influence of yogic discipline, I had suffered no sickness for over twenty years. At one point I remained awake for 30 days and even this had no ill effects on my health. But when I went to India on a very exhausting lecture tour, I ended up developing a stomach ulcer. At the same time a bad case of eczema appeared on both legs from knee to heel, more pronounced on the right side. There didn't seem to be an apparent connection between the two until I noticed that the rash was running exactly along the sunlight stomach meridian of Chinese acupuncture, which teaches us that the meridians are the transmission system through which vital energy flows throughout the whole body maintaining it in a living condition. The rash/ulcer connection seemed to indicate verification of the existence of these meridians, a very exciting discovery.

Here is a chart of the sunlight stomach meridian, leg portion. (Fig. 7) The rash ran from the jokokyo, horyu points to the kaikei point. Even though Chinese medicine has been able to accumulate a very detailed anatomy of points and meridians through the examination of countless patients over thousands of years, even the modern scientific study of acupuncture cannot yet give sufficient explanation of the reason for its effectiveness. Gradually, however, the anatomical, histological and neuro-physiological sciences are beginning to be able to elucidate the mechanism of the meridians and points through manipulation of which the healing effects of acupuncture take place. Recently, Professor Kim Bonham of North Korea has claimed to have discovered a kind of biological tissue which corresponds to the meridians of acupuncture. Neurophysiologically, we have such theories

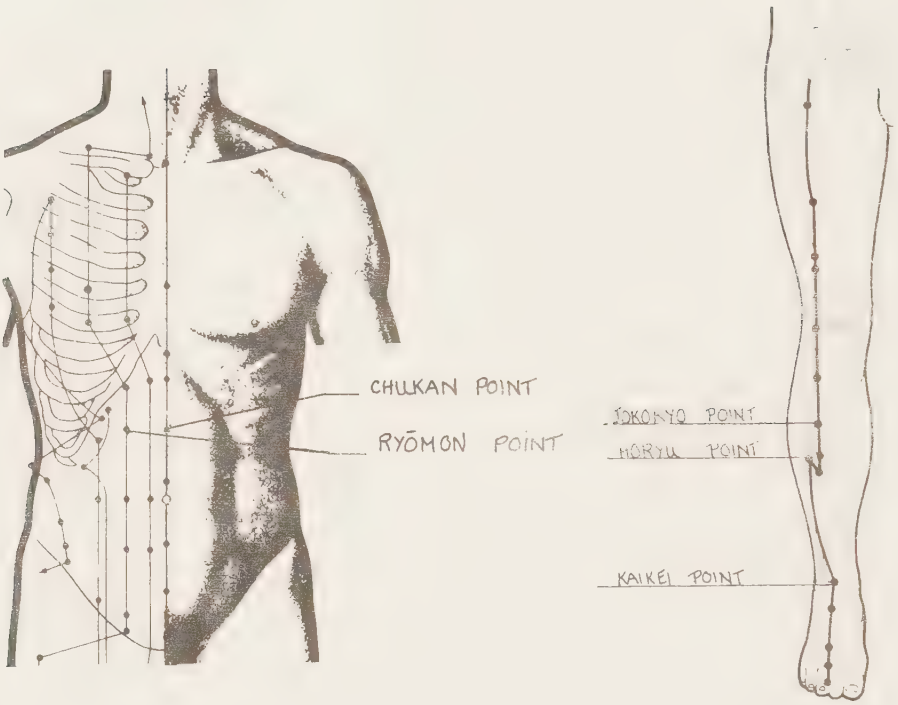

Fig. 7 Sunlight Stomach Meridian (Leg Portion)

as the viscero-cutaneous one discussed here. China, which seems to give equal importance to Eastern and Western medicine, appears also to be making significant advances in this research.

If we look at the reflex points of the stomach as delineated by the viscero-cutaneous reflex theory, we see that where a stomach ulcer or cancer is present, strong reflexes are evident at two points: one, termed chukan in acupuncture, located between the navel and the pit of the stomach, and the other, ryumon in acupuncture, located to

the side of the first. There are also reflex responses indicated at the lower back points known as iyu and hiyu, the stomach-associated point and spleen/pancreas-associated point, respectively. At the time of my ailment, I experienced definite reflex responses at these four points. Upon returning to Japan, a stomach X-ray was taken which revealed a linear ulcer in curvatura minor. All this fit together nicely with neurophysiological theory, but the Western medical system could offer no explanation for the leg rash which continued for three or four months after my return to Japan, and which clearly took the path of the sunlight stomach meridian.

My wife had an experience around the same time which led me to delve even further into the probable existence of meridians. Whenever she became overtired there was a notable difference in the temperature of the tips of her fourth fingers.

In the same way as the sunlight stomach meridian passes down the leg to the point located at the tip of the second toe, the tip of the fourth finger is the terminal point (seiketsu) of the triple heater meridian. The triple heater itself, sansho in Japanese, consists of the three kinds of vital energy received from the outside which sustain a human being from the time of birth. According to Chinese medicine, these three are: josho (upper energy), which functions in the heart and lungs, and is transported into the body through oxygen; chusho (middle energy), which functions in the digestive organs and enters the body through the absorption of food; kasho (lower energy), which functions in the genitourinary system and enters the body through the absorption of nourishment. The triple heater meridian is the path these three energies (prana) use to flow in and out of the body. There is no organ corresponding to the triple heater in modern medicine. (Fig. 8)

Fig. 8 Triple Heater Meridian (Arm Portion)

Upon measuring the temperature of both of my wife's kansho points (tips of the fourth fingers) when she was tired, I found a difference of 4 to 6 degrees C. There was also a great difference in the GSR (direct current) for the two points. I then searched through many books on acupuncture to check out these findings, and discovered that in the case of debilitation the indicated treatment is to perform moxibustion on the yochi point of the triple heater meridian. An old method of diagnosis was also described, whereby one tested the seiketsu of the fingers and toes for insensitivity to heat, as a meridian whose corresponding organ is diseased will show such insensitivity.

Considering all this, I began to test many different subjects, calculating the difference in measurement between right and left seiketsu points. This was done by attaching electrodes

able to measure both skin resistance and temperature to the seiketsu points of the fourteen exisiting meridians. I found many cases where there was a great difference in the value of the left and right seiketsu points of the triple heater meridian in patients who were debilitated, some very seriously. Western diagnostic methods were unable to find anything specifically wrong with these subjects. The seiketsu point of the triple heater meridian seems to be the place where the ebb and flow, the balance of the vital energies can be measured. The seiketsu points of the stomach meridian in my case also showed a great difference in value.

In the above manner, a new method of diagnostic examination appeared to have been discovered, through which we were able to simultaneously measure the condition of the life force (prana) throughout the body, the condition of the autonomic nervous system, and the functional states of internal organs. All this was possible because each meridian is known to have a close relationship to the function of a fixed internal organ.

To investigate the validity of these early findings a long series of experiments were undertaken, testing about 100 subjects over a two year period. Here is a diagram (Fig. 9) showing the position of the seiketsu points of each meridian. At first, skin resistance values were measured at all the right side and left side seiketsu points by attaching negative electrodes to seiketsu points and a positive electrode to another part of the body. The differences were recorded. Also, stimulation in the form of rectangular voltage (10 - 30 volts; 1 - 2 mA) was applied 4 - 5 times per second between two arbitrarily chosen points on the body. The differences in the skin resistance values between before and after stimulation were recorded at various seiketsu points.

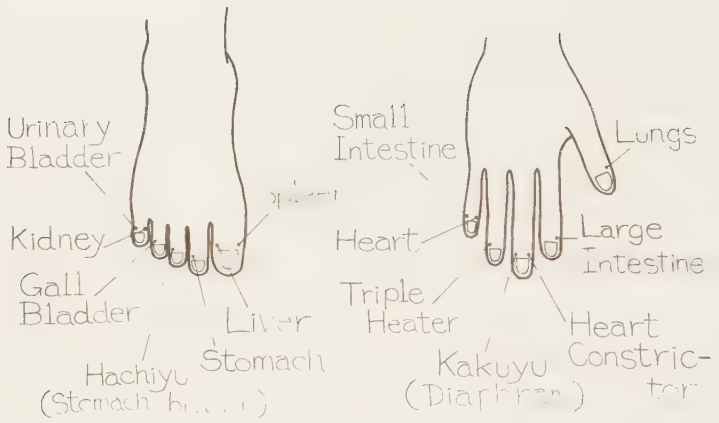

Fig. 9 Meridian Terminal Points (Seiketsu)

That the current value increases after stimulation is due to the fact that stimulation reduces the skin resistance thereby causing the current to increase (See Fig. 10). In

M. F. 3 V 24 C T 1003.8 mb 41 %

EXAMINATION DATE MARCH 5, 1971

NAME H.I. AGE 19

PAST MEDICAL HISTORY

CHIEF COMPLAINT

SUBJECTIVE SYMPTOMS

SYMPATHETIC TYPE

	T.P. / VALUE	HANDEDNESS L-R	DIFFERENCE L-R
BEFORE STIMULATION	EX		
	EX'		
	X		
	O		

T.P. = TERMINAL POINT (SEIKETSU)

T = TEMPERATURE

R = RESISTANCE

C = CAPACITANCE

STIMULATING	SANRI POINT IN LEFT LEG 22V 0.5mA														
FOOT T.(R.)C.	L	R	T.P.	D	FOOT	L	R	T.P.	D	HAND	L	R	T.P.	D
B. .	14	15	T.P. OF SPLEEN	1	B.S.	15	14	T.P. OF KIDNEY	1	B.S.	15	15	T.P. OF HEART CONSTRICTOR	0
A. .	34	22		12	A.S.	30	21		9	A.S.	27	26		1
D →	+20	+7			D →	+15	+7			D →	+12	+11		
B. .	11	11	T.P. OF LIVER	0	B.S.	14	14	T.P. OF URINARY BLADDER	5	B.S.	21	20	T.P. OF KAKUYU DIAPHRAGM	1
A. .	20	21		1	A.S.	27	32		3	A.S.	45	38		6
D →	+1	+10			D →	+13	+18			D →	+24	+18		
B. .	10	10	T.P. OF STOMACH	0	(SAME T.(R.)C.)					B.S.	26	13	T.P. OF TRIPLE HEATER	13
A. .	9	1		16						A.S.	47	25		22
D →	+11	+11								D →	+21	+12		
B. .	14		T.P. OF STOMACH BRANCH	1	B.S.	24	20	T.P. OF LUNGS	4	B.S.	38	14	T.P. OF HEART	24
A. .	7	7		6	A.S.	84	31		33	A.S.	86	23		63
D →	4	4			D →	+60	+11			D →	+48	+9		
B. .	13	13	T.P. OF GALL BLADDER	5	B.S.	8	16	T.P. OF LARGE INTESTINE	5	B.S.	34	21	T.P. OF SMALL INTESTINE	13
A. .	20	5		1	A.S.	13	21		5	A.S.	84	45		39
D →	+7	+12			D →	+5	+5			D →	+50	+24		

B.S. = BEFORE STIMUALTION A.S. = AFTER STIMULATION D = DIFFERENCE

Fig. 10 Table of Skin Current Value: L/R Seiketsu

sympathicotonic subjects, a 10 to 20 mA increase is shown in each seiketsu point. When the GSR and plethysmograph are taken for the same subjects, the GSR clearly shows excitement of the sympathetic system, while the pulse waves are high, indicating strong systolic action. As for the ECG, in most cases there are high R spikes. It is thought that the organs which correspond to the meridians evidencing a large difference between left and right seiketsu points usually show a functional abnormality, instability, or an imbalance. As an example, in Fig. 11 we see a left side value of 5.5 in the heart meridian, as contrasted to the right side value of 28, the difference being extremely high at 22.5. According to this subject's ECG, Chest Lead I and Limb III show a T wave declination which indicates excitement of the ventricle. (Fig. 12) The existence of an abnormality, therefore, was hereby corroborated through two different diagnostic methods.

NO. 83 DATE Feb. 16,1971

NAME N.K. M (F) AGE 16

3V 21°CT 1024.9mb 52%

TERMINAL POINT / VALUE		HAND, FOOT LEFT	RIGHT	DIFFERENCE
BEFORE STIMULATION	ΣX			[illegible]
	ΣX^2			4867.0
	$\bar{X}$			[illegible]
	6			10.7782

FOOT TEMPERATURE (RESISTANCE) CAPACITANCE	LEFT	RIGHT	DIFFERENCE	HAND TEMPERATURE (RESISTANCE) CAPACITANCE	LEFT	RIGHT	DIFFERENCE
TERMINAL POINT OF SPLEEN	7	25	18	TERMINAL POINT OF LUNGS	4	15	11
T.P. OF LIVER	5	36	31	T.P. OF LARGE INTESTINE	3.5	10	6.5
T.P. OF STOMACH	6	18	12	T.P. OF HEART CONSTRICTOR	45.5	10	(35.5)
T.P. OF STOMACH BRANCH	10	8	2	T.P. OF KAKUYU DIAPHRAGM	14.5	10	4.5
T.P. OF GALL BLADDER	3	10	7	T.P. OF TRIPLE HEATER	38	10	28
T.P. OF KIDNEY	6	17	11	T.P. OF HEART	5.5	28	(22.5)
T.P. OF URINARY BLADDER	6	7	1	T.P. OF SMALL INTESTINE	6	29	1

Fig. 11 Table of Skin Current Value: L/R Seiketsu (Note Heart Meridian)

Next, the standard deviation concerning the differences of left and right seiketsu points before stimulation was calculated. The majority of healthy subjects show about 2.0. (Fig. 13) Checking the statistics of sixty subjects,

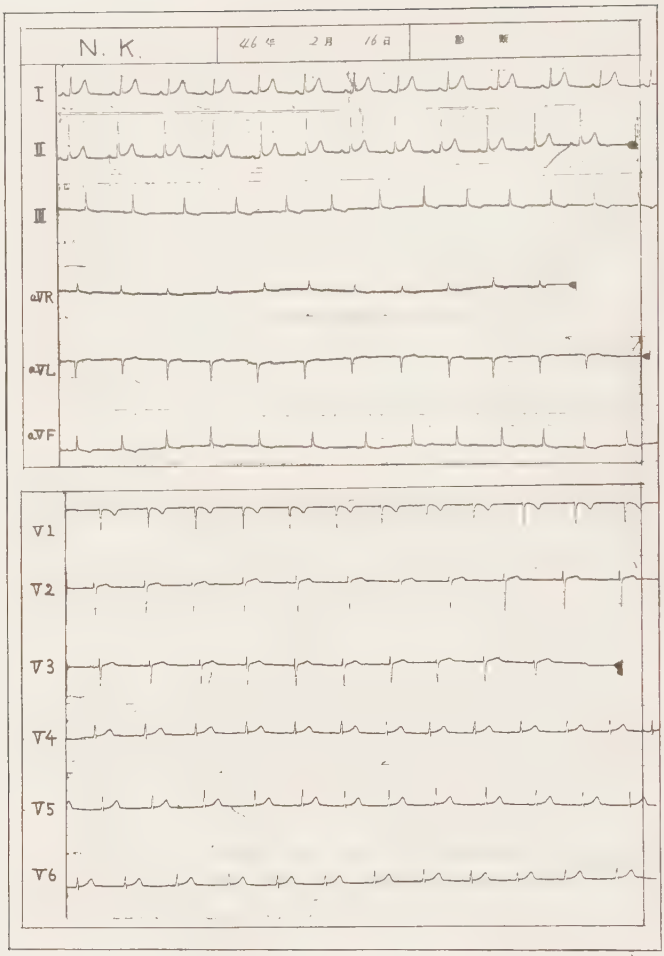

Fig. 12 ECG of Same Subject (Fig. 11)

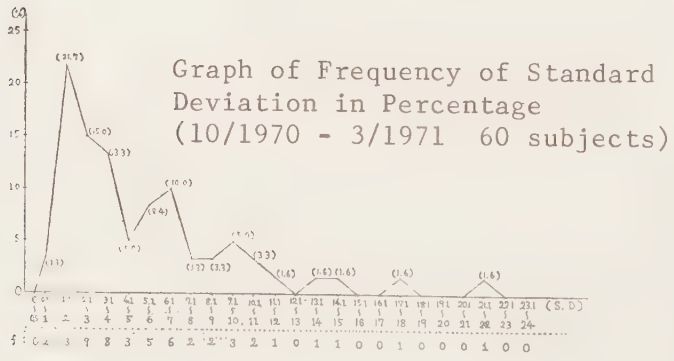

Fig. 13 Graph of Standard Deviation

we found the value of standard deviation to be from 0.5 to to 5, peaking at 1.1 to 2.0. Anything over 5 was found to indicate a definite imbalance in the autonomic nervous system. Subjects with a high degree of autonomic nervous instability have been known to show a deviation of as much as 23. The generalization which can be drawn from this material is that deviation of a person in a normal state of health may range from 0.51 to 5.0. Within this range, the deviation most usually falls between 1 and 4, centering around 2.0[6]. Those adept in yoga show a deviation of six plus, the average ranging between 6 and 8.

Another method used to validate the seiketsu measurements was to have the subjects fill out a survey sheet of personal disease history/tendency by circling appropriate symptoms listed in relation to specific organs. These were counted and the number served as the scale. At the same time, the above differences in current values between right side and left side seiketsu points were divided by the smaller of the two thereby yielding indices such as 0.7 and 1.3. This normalization procedure made comparison between different individuals possible. When statistical tests were performed as to whether there was recognizable correlation between these normalized values and the disease-disease tendency scores, a fairly high correlation coefficient (0.5 - 0.7) was obtained.

Another method of verification was to compare the results of the meridian testing with the diagnosis of the same patient made by a physician. One example of the many cases of agreement occurred when a father and daughter came to the

---

[6]An interesting finding from this research is that people who live in Tokyo, where pollution is heavy, invariably show a high deviation in the lungs and respiratory system, though they are personally unaware of any disfunction.

Institute to see about the possibility of arranging a psychic operation. A doctor had told the daughter that her father had stomach cancer, while he led the father to believe that he only had an ulcer. The patient's condition had been detected during a routine check-up through a stomach X-ray. As yet he was suffering no pain and felt energetic enough to go anywhere necessary for what he thought was just an ulcer operation. When this man was examined by the meridian method, a large difference between left and right stomach meridian points was discovered, showing the seriousness of the situation. However, the triple heater points did not evidence such a great difference which is related to the fact that he still felt healthy. One more example of the corroboration of diagnosis would be the case of our assistant who showed large differences in her bladder and kidney values (Fig. 14) shortly before a physician diagnosed her as having cystitis.

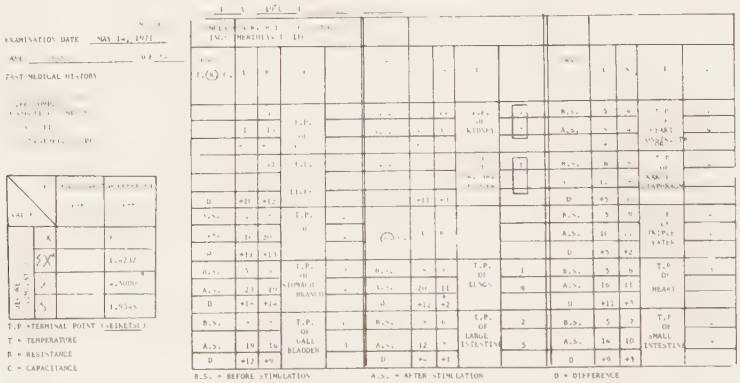

Fig. 14 Table of Skin Current Value:
L/R Seiketsu (Note Kidney & Urinary Bladder)

There is no room here to discuss the many other examples of corroboration, but the above should be sufficient to suggest that seiketsu measurement is useful in determining the state of the autonomic nervous system, in measuring the life force, and in diagnosing problems of the internal organs.

Characteristics of the Spiritually Developed Individual

The next stage of the research was the attempt to clarify the differences between spiritually developed and normal subjects. As noted previously, the standard deviation (SD) of a normal person falls between 0.51 and 5, with the peak at 2, whereas a spiritually developed person's falls between 6 and 8. In contrast, a seriously ill person, or a severely handicapped child, shows an SD close to 0, perhaps .2 or .3. The same low SD may be seen in people whith very weak constitutions or those normal individuals who have pushed themselves to the limits of exhaustion. This low SD is an indicator of the lack of ability to react to stimulation, meaning that the autonomic nervous system is hardly working, the life force hardly moving. What, then, are the special characteristics of the psychically developed individuals who produce such a contrastingly high SD?

First, yogis who claim to have awakened chakras show a much wider activity in the function of the autonomic nervous system, particularly in the nerves controlling the organ which corresponds to any awakened chakra. In other words, there is an increase in competition between the sympathetic and parasympathetic nerves. It is claimed that the chakras most often awakened in yogis are the manipura and the anahata chakras. Gopi Krishna's story is a case in point, as he vomited up everything he ate for three months after his kundalini awakened. This is because the stomach, which corresponds to the manipura chakra, first undergoes the physiological changes due to the awakening of kundalini. Gopi Krishna writes that he then became aware that his heart function was altered. The heart corresponds to the anahata chakra. Similar changes in the stomach and the heart seem

to happen to all spiritually advancing persons.

The widening of the competition in the sympathetic and parasympathetic system of the autonomic nervous system which follows the awakening of kundalini is indicated by the magnitude of the standard deviation concerning the difference of the current values between right and left seiketsu points. This is because the right side-left side difference tends to increase as the function of the internal organ corresponding to the awakened chakra becomes increasingly abnormal. Normal people having unstable autonomic nervous systems also show great right side-left side differences, however.

What are the differences, then, between normal persons having an unstable autonomic nervous system and a psychically developed person whose chakras are awakened and autonomic competition widened? Focusing on this consideration, let us make clear the characteristics of a psychically endowed individual's autonomic nervous functions.

In the case of a normal person who has autonomic nervous instability, as opposed to a psychic who appears to have the same condition, there is no rhythm to the instability. But upon examining subjects who possess paranormal abilities, such as the Kakinada guru, fixed rhythms in the abnormal pulse and respiration are observed. This disproves the hasty conclusion of instability, and shows rather a wider degree of competition in the autonomic system. The appearance or lack of this rhythm is one key used in determining whether or not a subject has been able to awaken chakras. Compare chart 15, the polygraph of the Kakinada guru, and 16, the polygraph of a normal person with autonomic instability. In the plethysmograph of the guru we see wide fluctuations appearing with fixed rhythm in the baseline, where this is

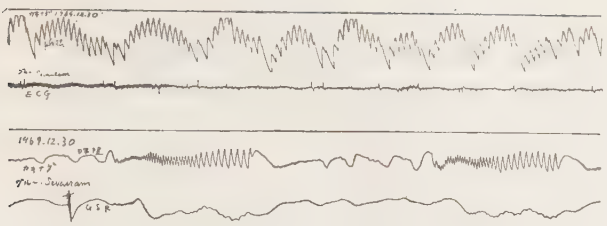

Fig. 15 Polygraph of Kakinada Guru

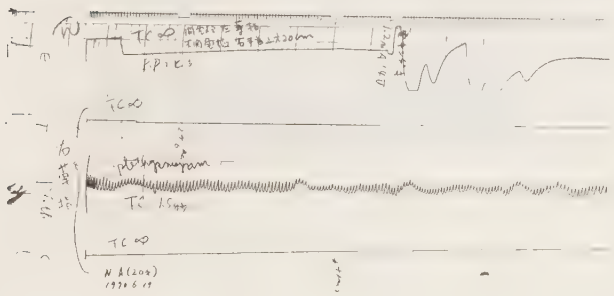

Fig. 16 Polygraph of Normal Subject With Autonomic Instability

not at all evident in the other case.[7]

Another key used in determining the distinction between a person with autonomic nervous instability and a yogi with awakened chakras is the subject's ability to consciously control autonomic nervous function. Fig. 17 is the ECG of an Indian guru who possesses the ability to freely control the actions of his heart. This data was taken at the Lonawara Institute by a medical doctor, the head of the Institute. We see the heart beat becoming slower and slower, until in the fourth line we clearly see it stop.

---

[7]The slight change in the shape of the wave in Fig. 16 is due to the fact that the plus and minus electrodes were attached in a manner opposite to the usual.

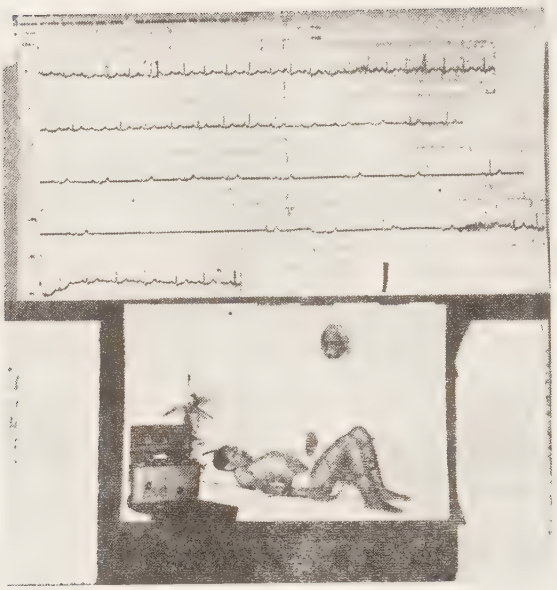

Fig. 17 ECG of Yogi Stopping His Heart Function

This data is probably the only piece of evidence of its kind in the world. I tried without success to obtain it previously while in India, but it has just recently come into my possession thanks to the kindness of the Lonawara Institute. In Kyoto there is a psychic who also claims to be able to stop his heart at will, and this ability was verified by Kyoto University doctors. However, upon personally examining him, I found this was not so. We took both his plethysmograph and ECG. The plethysmograph showed clearly that the pulse in his fingertip did in fact stop, but we also discovered slight movement in the ECG. In order to stop his heart, this subject tried to stop respiration, but his respiration rate was 1.9 breaths per minute. The Indian yogi also used this method to stop his heart, but in his case there was no movement in the ECG, conclusively proving that he does possess the ability to volitionally control the function of

his autonomic nerves.

One more characteristic which distinguishes yogis and psychics from the ordinary individual has become very evident through many years of research in this field. Namely, this type of person displays a much closer interdependence of body and mind than a normal person. Any physiological change is soon reflected in the mind, while any psychological change quickly influences the state of the body. In connection with this we have done various experiments, an example of which is illustrated in Figs. 18 and 19. The subject was a very bright law student who had never practiced any kind of meditation. Fig. 18 is his plethysmograph, respiration, and GSR taken in the control state, while Fig. 19 is the same taken while he placed his concentration in the middle of his forehead. The subject's respiration is normal in Fig. 18 at 16.8 per minute (13.9 is the figure for a fifty-second interval). In the plethysmograph, we see clear incisions produced by the shutting of the aortic valve, which indicate the elasticity of the contraction and expansion of the aorta. There are slight fluctuations in the pulse wave and baseline, but the amplitudes are fairly constant; the baseline is nearly level. The number of pulse waves is 65.8. Looking at the data taken after the subject began concentration, we see a marked appearance of the GSR where none was evident in the control state. Respiration goes from 16.8 to 23.3, a jump of 6.5 per minute. The pulse waves increase 11.2 per minute, from 65.8 to 77, while their amplitude decreases to about half the former. These changes all indicate a certain amount of excitation in the sympathetic nervous system, and generally represent the type of changes which occur when an ordinary person begins to concentrate. In comparison to this, what follows is an explanation of identical data taken for a yogi

in the control and concentrated states.

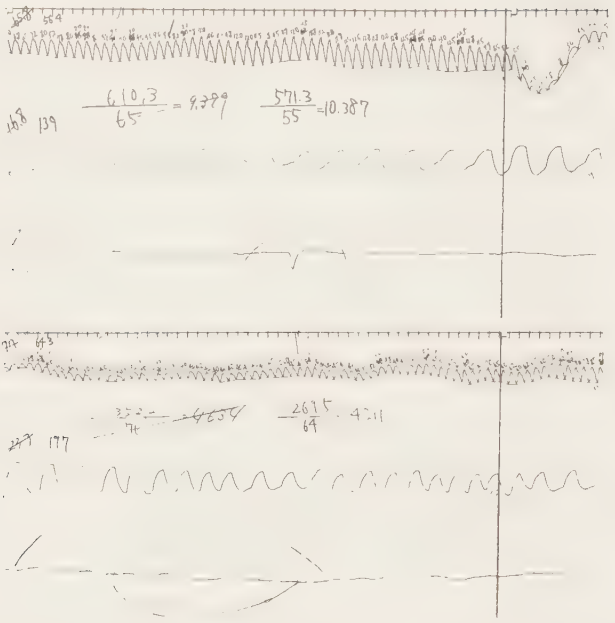

Fig. 18 Student: Control
Fig. 19 Student: Concentration

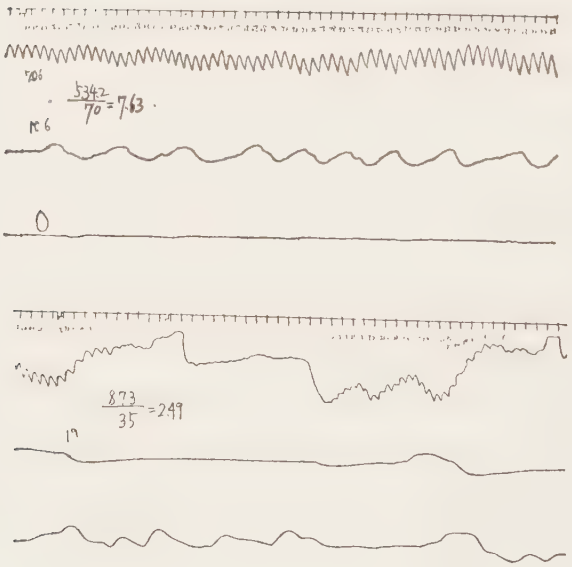

Fig. 20 Psychically Developed Individual: Control
Fig. 21 Psychically Developed Individual: Concentration

Fig. 20 represents the control condition. The respiration is slower than normal at 10.6 per minute. Pulse waves are normal at 70.6 per minute, while the baseline shows some rhythmical fluctuation. GSR is level. When concentration is begun (Fig. 21) respiration slows down greatly to 1.9 per minute. The baseline of the plethysmograph shows remarkable fluctuation, and there are a number of places where the waves almost disappear. GSR exhibits high frequency. These changes are remarkable in relation to the control, and become even more so when compared to the level of changes seen in an average subject. In the case of the spiritual person, his concentration, a change in his mind, exerts an exceptionally strong influence on his body, particularly on the autonomic nerves. Similar remarkable changes can be seen in the data of the yogi from Lonawara, who was seen to possess the power to willfully stop his heart. This evidence seems to confirm that the mind/body relationship of a psychically developed person is different than that of a normal individual.

Another very important point is that at the same time a yogi or psychically developed person exhibits a high correlation between body and mind, he also possesses the ability to transcend the physical body and the mind which we are normally aware of; that is, the mind which works in correspondence with the ordinary body. Such an individual is able to pass into an unlimited state, into another dimension. Further, he may be said to exist in the wider mind of the other dimension while simultaneously existing in the dimension of the ordinary mind/body. Even if there is excruciating pain in the body, therefore, this person is able to remain unaffected by it, and no matter what kind of pain or sorrow the ordinary mind is suffering, he is able to pass through it undisturbed.

This non-ordinary dimension of being is characterized and discussed in different ways by various religions and philosophies. For example, in Ikutaro Nishida's philosophical writings we often see the statement "from the actor to the observer", and what we are here discussing may be compared to the standpoint of the observer. On the one hand, we have that which acts, and, on the other, that which goes beyond the act and observes it. In a somewhat similar manner, the Sankya teachings of yoga state that there exists a True Self (purusha) which manifests Itself as the contemplative observer. Sankya teaching states that the universe is composed of two underlying principles, one being purusha and the other the material or manifest side of the universe, prakriti. Prakriti is divided into three qualities, called gunas, according to the way the prakriti is viewed by purusha. Creation takes place when these gunas lose their fundamental harmony and begin to move. The mind and body of which we are normally conscious are products of prakriti. The important point to stress here in contrast to Nishida's philosophy is that purusha is considered to have no relationship to manifestation and activity, i.e. prakriti. In Nishida's and similar philosophies, however, the actor and observer seem to have an inherent relationship. The crucial point of difference is that the observer in yogic philosophy exists in a transcendent state of contemplation, and causes all things according to what it sees.

As for psychology and physiology, they take as their object of research the ordinary mind and body, rather than the super-consciousness which exists in a liberated realm viewing all from a transcendent perspective--the fundamental object of yoga. Accordingly, it does not seem possible to reach super-consciousness through the use of hypnosis or

autogenic training for the very reason that they concentrate only on the ordinary body and its associated mind.

Assuming that a state of super-consciousness exists and that it can be reached through the practice of yogic discipline, we still find great difficulty in scientifically verifying or investigating this realm. There seems to be no objective way in which this basic advancement itself can be measured or examined by physical means. We are as of now only able to investigate the observable concomitants of this super-consciousness.

Looking closely at the internal aspect of those persons whose minds and bodies have been completely absorbed in yoga for many years, certain observations can be made. Through the awakening of chakras and the kundalini, a higher consciousness gradually separates from the body and that mind which is connected to it. This evolutionary development is what leads one to the liberated condition. Looking at this process from the standpoint of the consciousness and the unconsciousness, the changes which occur in the consciousness during spiritual evolution extend to a greater depth and width than the apparent limits of the unconscious. A heretofore unknown consciousness awakens, that which we have been calling super-consciousness. One basic criterion for distinguishing these two types of consciousness is that superconscousness possesses the ability to directly affect the external environment or minds of other beings without using physical means. Such ability has come to be termed "paranormal ability" and parapsychology is the science which investigates the v rity of super-consciousness through testing these abilities.

Here is a description of one such parapsychological experiment which was carried out at our Institute dealing with psychokinetic ability. Fig. 22 is a drawing of the

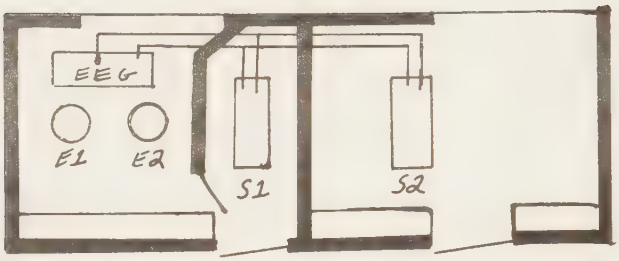

Fig. 22 Diagram of Laboratory

room arrangement used. Each room is electro-statically shielded by lead netting. Subject 1 is the agent, the sender of psychokinetic energy, named Tony. Subject 2 is the percipient, the receiver. At first the subjects unknowingly had their EEG, plethysmograph, respiration, and GSR taken as the control data. Next, Subject 1 was given the signal to send his power to the percipient in the next room, who was not told anything. The control and experiment data were then compared to see what, if any, changes had been produced. Various people were used as Subject 2, and it was found that those who practiced yoga or possessed psychic ability reacted to the influence of Subject 1 more strongly. A similar phenomenon is often noted in hypnosis, where the degree of the hypnotist's effectiveness seems to vary greatly from subject to subject.

Fig. 23 represents some important, dramatic data obtained from the experiment using Tony as the agent and my mother, a spiritually developed person, as the percipient. In each graph, the top two lines are Tony's respiration and GSR, and the bottom two are my mother's. Left of "concentration start" is the data of the control state; right of this is the experimental data. After Tony begins to concentrate we can see

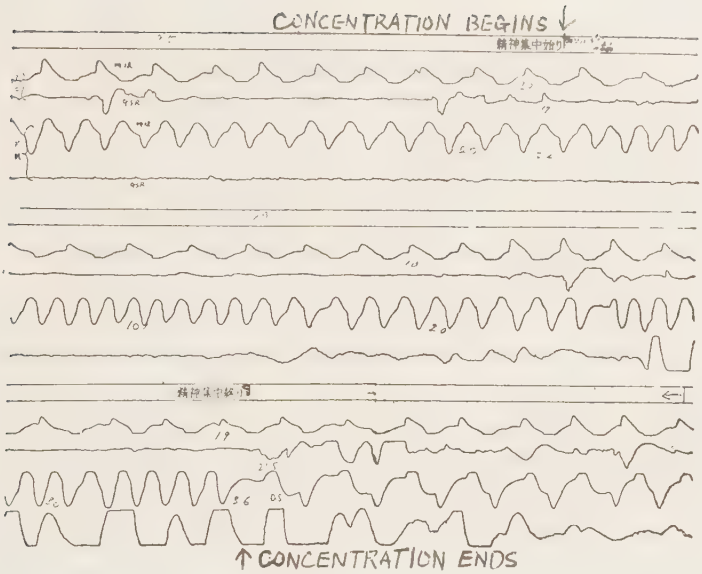

Fig. 23 A - P Test (GSR, Respiration)

Fig. 24 A - P Test (Plethysmograph)

Subject 2's respiration rate become much faster. Then, in about thirty seconds, we see the breath become slightly irregular. As for the GSR, we begin to see its appearance 20 or 30 seconds after Tony begins concentration. Between 40 and 60 seconds these fluctuations become remarkably forceful. Tony's data shows an opposite trend to Subject 2's. When Tony begins to concentrate, his respiration becomes slow, shallow and rhythmical. Where we can see occasional appearance of the GSR before concentration, after commencement the line becomes comparatively flat. In the third graph we can see the changes in data after Tony stopped directing his concentration. At that moment, my mother's breath began to slow down. The GSR fluctuation gradually diminished in the next 10-12 second period. Unlike her reaction, as soon as Tony stopped concentration there was a remarkable jump in his GSR. His respiration returned to being fast and deep, as in the control state.

Here is the plethysmograph data taken at that time (Fig. 24), the top line of each graph measuring Tony and the bottom my mother. There is baseline fluctuation before Tony begins to concentrate. Along with this, the shape of the waves and their amplitude indicate an abnormality or instability in the heart and circulatory system. My mother's line was fairly stable before concentration began[9]. When Tony first begins to concentrate he shows a certain degree of rhythmical baseline fluctuation, but this grows stable. My mother continues to produce fast waves of low amplitude for

---

[9] In this case her plethysmograph indicates a very constant pattern, but in other tests at other times she produced the baseline fluctuation usually characteristic of spiritually advanced people. I say "characteristic" as a result of the findings obtained through plethysmographs done on countless subjects, and taken repeatedly for particular subjects.

2 or 3 minutes instead of reverting quickly to the control state, unlike her respiration.

This experiment suggests quite clearly that so called siddhi, i.e. paranormal powers, are not just products of the imagination, but rather are a definite kind of power whose influence can in actuality be exerted on the outside world. This, in turn, leads us to the deduction that a super-consciousness of a non-ordinary dimension does exist.

The Aim of Spiritual Development

In the preceeding pages we have touched on various aspects of yoga, and would now like to comment on the central purpose of yoga practice, that of attaining liberation, of reaching the Enlightened state. The most important point to be stressed here is that the Enlightened state does not merely consist of an internal change within the ordinary mind nor in the mind's attitudes. Many hold this misconception, in reaction to which other's have drawn the final conclusion that religion is nothing more than an opiate. Materialists such as Feuerbach serve as a good example. We can see this so-called opiate at work in the many people who create a belief in something whose existence cannot be seen. Such belief consists simply of a subjective change and offers no objective counterpart. It is the creation of a mind which, being unable to control itself, invents the existence of God and miracles for the sole purpose of self comfort. This process, however, brings no objective power in relation to the outside world and therefore, can in no way be equated with Enlightenment.

Freud explains the process this way: To protect himself against fear, a child creates what is called the "father image" inside his subconscious mind. This image continues to exist there even after the child has become an adult. Upon

facing a natural threat such as a storm or an earthquake, the man projects the father image onto the fearful phenomenon and calls it God. This fearful God, the raw power of Nature, is then worshipped in order to obtain forgiveness and in the process the heart is calmed and fear dispelled. Enlightenment cannot be explained as easily as this, however, for when true Enlightenment is attained one breaks through the shell of individual existence and awakens to a consciousness born of a higher dimension. At the same time, paranormal abilities are simultaneously awakened, as when an infant born into this ordinary world is naturally endowed with hands, feet, and the five senses. According to the Yoga Sutra, if this consciousness and these abilities are not actualized, not developed, true Englightenment has not yet been reached.

We can see the power of Enlightenment in many of the new religions now flourishing, whose founders possess the power to directly affect and support the daily lives of their believers. This support is difficult to find amidst the emptiness of most modern-day traditional religious sects, of which little remains by theory and doctrine. The fervor with which many support these new religions and claim to be helped by them tends to suggest that these new sects are not all just founded on delusion. Rather, they are strong because their believers have come in contact with the power of Enlightenment in the persons of those beings who have attained some level of realization through the actualization of religious practice. Yoga, then, is not an attempt at superficial internal changes, but is a path which leads one into a state of liberation and offers one the ability to directly affect and aid the external world.

REFERENCES

1. Avalon, A. The Serpent Power, Ganesh & Co., Madras, 1953

2. Dittmar, F., Dobner, E. Die Neurotopische Diagnose und Therapie Innerer Krankheiten, Karl F. Haug Verlag, Koln, 1961

3. Krishna, G. Kundalini--The Evolutionary Energy in Man, Ramadhar & Hopman, New Delhi and Zurich, 1967

4. Leadbeater, G.W. The Chakras, The Theosophical Publishing House, Adyar, Madras, 1969

5. Motoyama, H. "ESP, Chakra and the Autonomic Nerves", Religious Psychology Journal, Institute of Religious Psychology, Tokyo, 1966

6. Motoyama, H. Chakra, Nadi of Yoga and Meridians, Points of Acupuncture, The Institute of Religious Psychology, Tokyo, 1972

** 7. Motoyama,H. How to Develop Paranormal Abilities (Kundalini Yoga), Tokyo Sports Newspaper, Tokyo, 1974

8. Motoyama, H. Do Meridians Exist and What Are They Like?" Journal of Religion and Parapsychology, Institute of Religious Psychology, No. 1, Tokyo, 1975

9. Motoyama, H. How to Measure and Diagnose the Functions of Meridians and the Corresponding Internal Organs, The Institute of Religious Psychology, Tokyo, 1974

10. Motoyama, H. "The Mechanism by Which Psi-Ability Manifests Itself, Impact of Science on Society, Vol. XXIV, No. 4, UNESCO, 1974

11. Motoyama, H. The Non-Physical in the Correlation Between Mind and Body, The Institute of Religious Psychology, Tokyo, 1972

* 12. Motoyama, H. Introduction to Parapsychology, Ikeda Shoten, Tokyo, 1974

13. Motoyama, H. The Present Situation of Parapsychology in the World, The Institute of Religious Psychology, Tokyo, 1969

* 14. Motoyama, H. Religion and Parapsychology, The Institute of Religious Psychology, Tokyo, 1969

** 15. Motoyama, H. Yoga and Parapsychology, The Institute of Religious Psychology, Tokyo, 1972.

16. Veith, I. The Yellow Emperor's Classic of Internal Medicine, University of California Press, Berkely, 1966

17. Vivekanada, S. Raja Yoga, Vivekananda Center, New York 1955

18. Manaka, Y., Urguhart I The Layman's Guide to Acupuncture, Weatherhill, New York, 1972

19. Schultz, J. H. Das Autogene Training, Georg Thieme Verlag, Stuttgart, 1953

** English edition forthcoming

* Japanese edition only

DATE DUE

16:3847924 (MKN) 9/29/99

B
13
Y6
M6
GT

16:1535447449

JAN 2 2 06

GAYLORD PRINTED IN U.S.A.

B132.Y6 M69
Motoyama, Hiroshi/A psychophysiological
3 2400 00104 6535

Religion and P

(President: Hiros

4-11-7 Inokashira

Mitaka-Shi, Tokyo 181

Tel. 0422-43-5558

Japan

First Edition, June, 1976

GTU Library
2400 Ridge Road
Berkeley, CA 94709
For renewals call (510) 649-25
All items are subject to recall